DOCUMENT RESUME

ED 417 338 CE 076 083

AUTHOR Larrick, Steve
TITLE A Living Systems Model for Assessing and Promoting the Sustainability of Communities.
PUB DATE 1997-06-00
NOTE 25p.; Paper presented at the Annual Meeting of the Community Development Society (Athens, GA, July 27-30, 1997).
PUB TYPE Reports - Descriptive (141) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Adult Education; *Community Development; *Community Planning; *Holistic Approach; Individual Development; Models; Strategic Planning; Sustainable Development; Synthesis; *Systems Approach
IDENTIFIERS *Living Systems

ABSTRACT

A living systems model of community development has been synthesized from elements of three perspectives: (1) a global movement toward more sustainable patterns of human development that is identifying indicators of community health in a wide range of categories; (2) research on the complex interactions of living systems that make life on earth possible; and (3) research on traditional indigenous societies for integrated and holistic perspectives on the nature of our connection with the universe and the cosmos. The model consists of five concentric circles centered on an "axis of sustainability." Each circle represents one the five basic levels of current science (physical, biological, psychological, social, and cultural). The model illustrates key processes by which living system have tended to evolve to more complex levels of existence (as represented by the five concentric circles) by resisting entropy, becoming sustainable at each higher level of existence, and ultimately transcending prevailing boundaries to higher (more complex) states of being. The model is proposed as a tool for better understanding the meaning of life in community and developing additional tools needed to guide communities toward long-term sustainability as complex, multidimensional living systems. (Contains 44 references.) (MN)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 417 338

A Living Systems Model for Assessing and Promoting the Sustainability of Communities

A paper prepared by:
Steve Larrick
UNL College of Architecture
210 Architecture Hall
Lincoln, NE 68588-0112

for presentation at the 1997 annual conference
of the Community Development Society,
held in Athens, Georgia,
on July 27-30, 1997.

CE 076 083

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

S Larrick

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

BEST COPY AVAILABLE

ABSTRACT

A primary mission of the Community Development Society is to integrate knowledge from many disciplines into a better understanding of communities as complex and multi-dimensional entities. Our predominant scientific paradigm does a good job of expanding our knowledge base by breaking the complete framework of life into many distinct disciplines. It is weak, however, at providing the tools to re-integrate them into a common conceptual framework through which we can better understand community.

Elements of an alternative worldview which would provide the basis for an integrated, holistic perspective on communities and how to attain long-term sustainability appear to be emerging from three different areas of thought and study. First, a global movement toward more sustainable patterns of human development is identifying indicators of community health in a wide range of categories. Second, other investigators are looking at the complex interactions of living systems that make life on earth possible. Third, others are looking to traditional indigenous societies for integrated and holistic perspectives on the nature of our connection with the universe and the cosmos.

This paper synthesizes elements of these three perspectives into a **Living Systems Model of Community Development.** The model integrates each of the five basic levels of current science into a common "living systems" context patterned after the prevailing concentric structure of many levels of the universe. The model illustrates key processes by which living systems have tended to evolve to more complex levels of existence -- from the physical through the biological, psychological, social, and cultural levels of development -- *by resisting entropy, becoming sustainable at each higher level of existence, and then transcending prevailing boundaries to higher, more complex states of being.* With the help of this model, we may begin to better understand the meaning of life in community and may be able to develop additional tools needed to guide communities toward long-term sustainability as complex, multi-dimensional living systems.

INTRODUCTION

In 1989, the membership of the Community Development Society adopted a *Vision and Purpose (Mission) Statement* which proclaims that:

(a) **"We believe community is complex and multi-dimensional..."** and that

(b) **"We view community development as a profession that integrates knowledge from many disciplines with theory, research, teaching, and practice..."**

If a primary mission of the Community Development Society is, indeed, to integrate knowledge from many different disciplines into a coherent view of community, it is important to look at how the current prevailing scientific paradigm, or world-view, either contributes toward or limits the development of a better understanding of communities as "complex and multi-dimensional." To understand the complex nature of community and how we can assess and promote long-term community sustainability may require that a new scientific context be built with which to view reality.(Phillips & LeGates,p.379)

Where limitations exist in the existing scientific paradigm, we need to look to other sources of human thought for pieces of the larger puzzle of community. Three promising sources for a more integrated, holistic view of community include: (1) **"sustainable development theory"**; (2) **"living systems theory"**; and (3) some of the integrated, holistic worldviews common among **traditional indigenous societies**. This paper looks at some of the contributions and limitations of each of these areas of thought and then seeks to integrate the best elements of each into a coherent whole, a **Living Systems Model of Community Development.**

METHODOLOGY

A world-view, or paradigm, is the "conceptual framework" by which a society organizes knowledge, and in the light of which its individual members, communities and the overall society -- seek to understand their relationship to the environment, including the world of which they are part and whatever all-encompassing cosmos they espouse.(Goldsmith, p.3) Given that the development of an integrated and holistic conceptual framework for community development is an important goal, it stands to reason that we must look to a variety of literature sources for elements that contribute to a better understanding of the whole. In order to accomplish this task, the author seeks to address the following five questions in the course of this paper:

(1) How does the **prevailing scientific paradigm or worldview** contribute toward or limit our capacity to better understand communities as "complex and multi-dimensional"?

(2) How does **"sustainable development theory"** contribute toward or limit our capacity to better understand communities as "complex and multi-dimensional"?

(3) How does **"living systems theory"** contribute toward or limit our capacity to better understand communities as "complex and multi-dimensional"?

(4) How do **belief systems common among traditional indigenous societies** contribute toward or limit our capacity to better understand communities as "complex and multi-dimensional"?

(5) How can appropriate elements from all these sources be integrated into a more holistic **Living Systems Model of Community Development** that helps assess and promote the long-term sustainability of communities?

In the process of addressing these questions, a conceptual framework for a more holistic view of community development is revealed and presented as a model for assessing and promoting the sustainability of communities.

BUILDING A LIVING SYSTEMS MODEL OF COMMUNITY DEVELOPMENT

(1) Contributions of the Prevailing Paradigm Toward A Holistic Perspective

A premise of this paper is that there is a tendency for the prevailing mainstream scientific paradigm to create a vast wealth of knowledge, but that this knowledge is often fragmented and disconnected. Our knowledge base is growing rapidly, but it is also being broken down into many specialized disciplines which are seldom re-integrated into a meaningful whole. This flawed scientific framework severely limits our ability to develop an integrated, holistic vision of community development. This, in turn, contributes to many systemic flaws within our communities that are difficult to remedy without a more holistic approach. This situation threatens the long-term sustainability not only of many communities, but of human society as a whole.

Our academic world tends to be broken down into many specialized "intellectual cloisters," each with its own "sacred language." Isolated by a type of "turf transfixion," each specialized discipline tends to reveal vast amounts of information about specific sub-

components of the overall community development picture, but in the absence of an integrated, holistic framework, it still remains very difficult to study a phenomena as complex and multi-dimensional as a city.(Phillips and LeGates,p.30) Fragmentation of knowledge is hindering our capacity to generate a holistic understanding of the true foundations of community life and long-term sustainability.

Put bluntly, we are faced with a rapidly growing human population that is increasingly dependent on a finite and diminishing natural resource base. We have been slow to grasp the big picture of basic requirements for surviving and thriving in the 21st century. Unless we begin to bridge our intellectual fragmentation with more integrated, holistic perspectives, our universities could become the "Towers of Babel" of the 21st century, failing to speak in a common language and common context about the challenges we face as a global community.

In their introductory text for urban sociology, Phillips and LeGates describe the absence in academia of an integrated vision of urban community life. They observe that "...no synthesis of views or information is on the horizon: the current lack of a single agreed-upon conceptual framework and the absence of meaningful consensus among urbanists prevent it."(p.47) Hoping to encourage academics to create more holistic approaches for addressing the complex issues of cities, they quote John Henry Cardinal Newman, who argued in 1852 that:

> ...a true university education should provide the power of viewing many things at once as 'one whole, and referring to them severally to their true places in the universal system, and understanding their respective values and determining their mutual dependence.'(Phillips & LeGates,p.30)

The need for this kind of holistic perspective in universities is even more critical in today's world as we approach the monumental challenges of the 21st century. In order to develop an integrated scientific framework within which to better assess and promote community sustainability, one part of the solution would be to provide more public and private financial support for research into sustainable systems and sustainable communities. As Burch and Wade found in their long-term analysis of research priorities in natural resource sociology, the direction of research is closely related to where the research dollars are being committed.(Burch & Wade,1985) The Kellogg Foundation is one group that is helping fund activities related to sustainable agriculture and sustainable development. Higher priority needs to be given to enhancing our scientific understanding of long-term sustainability and the health of complex living systems. Clearly, "**community sustainability**" is a pressing issue that deserves greater study, clarification, and implementation.

BEST COPY AVAILABLE

(2) Contributions of Sustainable Development Theory to a Holistic Perspective

Growing concern for the **long-term sustainability of human development,** prompted by threatening trends such as global warming, ozone depletion, crude oil depletion, is a key issue contributing to the emergence of a more integrated vision of community development. An early landmark in the movement toward sustainable development was **Habitat I**, the 1972 U.N. Conference on Human Habitats, held in Stockholm, Sweden. That global conference looked at emerging environmental problems in cities throughout the world and sought to bring together design solutions for improving human habitats. It laid groundwork for the 1987 **World Commission on the Environment and Development**, which resulted in an influential final report entitled *Our Common Future*. Out of *Our Common Future* came the most commonly used definition of sustainable development:

> ***"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."***

Interest in sustainable development continues to increase globally, nationally and locally. **Habitat II**, the United Nations' **Conference on the Environment,** held in Rio in 1992, fostered numerous sustainability initiatives. In 1993, for example, the World Bank began sponsoring annual conferences on **Environmentally Sustainable Development**. In the U.S., President Clinton established a **Council on Sustainable Development,** which gathered public input throughout the country for a national sustainable development action strategy designed to foster economic vitality while protecting natural and cultural resources.(President's Council,p.1) In September 1995, the U.S. Department of Commerce hosted a **"National Teleconference on Sustainable Cities"** that downlinked to colleges, universities and other sites across the country. In Nebraska in 1996, the UNL College of Architecture helped establish an **Institute for Sustainable Communities** at the historic Joslyn Castle in Omaha.

Another organization seeking to better understand and encourage community sustainability is the Environmental Policy Center in San Francisco. The Center's ***Global Cities Project*** serves as a clearinghouse for information and strategies regarding sustainable development. The project provides practical tips on a wide range of subjects such as water efficiency and solid waste management. The Global Cities Project is "...dedicated to, and based on, the following principles:

1) That the patterns of our social and economic development must be equitable and sustainable.
2) That such patterns will enhance and are necessary to urban prosperity and public health and safety.
3) That the power to affect such change lies within our grasp."(Environmental Policy Center)

Much of the current activity directed toward enhancing sustainability focuses on **agricultural** sustainability. At the University of Nebraska - Lincoln, for example, research activity at the **Center for Sustainable Agricultural Systems** is contributing to the study and adoption of sustainable agricultural techniques and practices. Kenneth Dahlberg, a political scientist from Western Michigan University, recognizes the importance of sustainable agricultural systems to urban areas and has worked with several cities to develop local strategies for achieving greater sustainability in local food systems.(Dahlberg, 1993) Similarly, the non-profit Minnesota Food Association works "to form an urban-rural coalition of informed, connected, and activated citizens committed to the development of a sustainable food and agricultural system in Minnesota."(MFA Brochure,1995)

The connections between agricultural sustainability and community sustainability are critical. The agricultural revolution involving food cultivation and the domestication of animals was a necessary precondition for the emergence of village and city life from hunting and gathering societies.(Phillips & LeGates,p.85) At the same time, however, Carter and Dale argue in their landmark book *Topsoil and Civilization* that throughout human history, unsustainable practices of farming and forestry have led to the exhaustion of topsoil and to the subsequent *breakdown of many, if not most, human civilizations*. Modern industrial agriculture, by being so dependent on our finite supply of fossil fuels, appears to be headed on a similar collision course in the long-term.

We are an increasingly urban population and, to many, the concept of **urban sustainability** seems an oxymoron. Cities have traditionally depleted natural resources from surrounding rural areas by converting natural resources into useful goods as well as waste and pollution. As public awareness and concern for sustainability grows, people are beginning to see that the true way toward sustainability is to get away from activities, practices and systems that are not environmentally or socially sustainable over the long term. Ultimately, the health of community environments depend on the environmental integrity of agricultural and wild lands outside city limits. Cities depend upon atmospheric and hydrologic cycles to purify and protect ecosystems that are the basis of long-term survival. To help protect urban ecosystems, an important step is to strengthen the public campaign to: (1) **reduce** consumption; (2) **reuse** materials; and (3) **recycle** wastes in complete resource loops, thereby cutting down on resource depletion and pollution, while allowing for a more equitable distribution of goods as well.

As cities and nations take up the challenge to seek more tangible meanings and applications for sustainable development, many are turning to indicators of sustainability. Scores of cities have developed shopping lists of indicators of sustainability at the local level. (Luther & Borner, 1995) Nationally, the President's Council for Sustainable Development has created a list of indicators under the following **"10 National Goals to Put the United States on a Path Toward Sustainable Development"**(President's Council,pp.2-7):

1. A Healthy Environment
2. Economic Prosperity
3. Equity
4. Conservation of Nature
5. Stewardship
6. Sustainable Communities
7. Civic Engagement
8. Population [Stabilization]
9. International Responsibility
10. Education

These are all worthy goals and the indicators being gathered under each goal are likely to provide useful benchmarks with which to gauge movement toward or away from long-term sustainability. But a limitation of the "sustainable development movement," however, is that there does not appear to be a systematic and scientific structure into which these goals and indicators fit into a logical pattern. We seem to be groping in the dark for a new paradigm, a new way of thinking about how human communities and the natural world can work in harmony. Using the language of Phillips and LeGates, the various initiatives seeking greater community sustainability need some "shared social understandings", based on scientific reconceptualizations, that can serve as the basis for a new, more sustainable "public order."(Philips & LeGates, p.232) Missing from the sustainable development dialogue is a better, more holistic understanding of communities as "complex and multi-dimensional" entities.

(3) Contributions of Living Systems Theory Toward a Holistic Perspective

A growing body of knowledge under the general heading of **"Living Systems Theory"** goes beyond the boundaries of existing scientific disciplines to look at life from a variety of more holistic perspectives. In very real ways, we are seeing that our lives, and the lives of our communities, are impacted by other living systems and, at the same time, that we impact other living systems in a living continuum, all the way from microbial life forms that thrive around and even within us, to earth's biosphere that supports all life and, in a sense, is itself a living system, Gaia, as described by James Lovelock (1979). In some ways, life is a layering of many different levels of community -- from the communities of microorganisms in healthy soil to the global biotic community in which all living things share.

A wide range of approaches are being taken to better understand life as an inter-connected series of complex and multi-dimensional living systems. Miller's dense and lengthy volume entitled *Living Systems* (1978) is full of valuable technical information on common characteristics of life, primarily at the **physical** and **biological** levels. Roszak is working at the **psychological** level toward broad, universal connections in his current work in "**eco-psychology**", arguing that, "We need a new discipline that sees the needs of the planet and the person as a continuum and that can help us reconnect with the truth that lies in our communion with the rest of creation."(Roszak,p.34) In *Eco-Philosophy: Designing New Tactics for Living* (1981), Skolimowski integrates principles of ecology into a living systems philosophy of life that contributes to a more ecological understanding of **social** and **cultural** systems. Capra's *The Web of Life: A New Scientific Understanding of Living Systems* (1996) takes a broad view of life and seeks to draw attention to new scientific understandings of complex living systems.

While these and other living systems approaches contribute valuable elements toward a new regenerative living systems worldview, only Larrick's *Evaluating Industrial and Regenerative Paradigms for Agricultural Sustainability* (a masters thesis in 1988) synthesizes an integrated, holistic model to illustrate how living systems sustain themselves at all levels of community. Basic to this model is an understanding that a unique characteristic of living systems is the capacity to resist **entropy**, or the Second Law of Thermodynamics. Entropy is a fundamental law of physics based on the fact that the physical universe is inexorably breaking down, cooling off, becoming more random. As far as we know, *only living systems are able to capture energy and resources from their environments to use as the means for further growth and development, a process that resists entropy.*

Also basic to much living systems theory is an awareness that modern industrial society is on an unsustainable course. Drengson, for example, describes some of the problems we face as a civilization and argues that:

> The dominant culture and character structures in contemporary industrial society have become pathological for they are consuming and destroying the very basis for human civilization and perhaps even our survival as a species. Yet it is not mere survival we should aim for, but optimum flourishing of human and natural communities all around the earth.(p.47)

To accomplish this goal of optimizing the potential of living systems, we need to build a new, more integrated and holistic model of sustainable community development that can help "...make connections between the grain of salt and the entire universe."(P&L,p.61) As Drengson argues, we need a more holistic view of life that would integrate human community into a living systems context that includes "...the chemistry, physics, psychology, economics,

politics, art, religion and so on, of the total gestalt that is characteristic of each particular place."(Drengson ,p.45) Within such a regenerative context of living systems theory, we would become part of a larger community of human and natural relationships, an ecological context like that described by Drengson:

> An ecological understanding of community, self and Nature is one which necessarily sees all boundaries as permeable membranes, and appreciates the biological, aesthetic, spiritual, psychological and other dimensions of ecological relationships.(p.44)

If there is a limitation to many of the current living systems theories, it may be that they try to be too all-encompassing without providing a concrete, systematic accounting for how living systems function as complex, multi-dimensional entities. This is a theme that will be addressed in Section 5 below, when the **Living Systems Model of Community Development** is presented.

(4) Contributions of Traditional, Indigenous Society to a Holistic Perspective

Edward Goldsmith, founder of the journal *The Ecologist*, has written an important article entitled "The Way: An Ecological World-View" (1997), in which he argues that there is a general tendency for traditional, indigenous, vernacular cultures to adopt worldviews that are inherently more holistic and sustainable than those prevalent in modern industrial culture. In explaining this greater sense of holism, he identifies three beliefs common among the worldviews of many traditional cultures:

(1) that the living world or ecosphere is the basic source of all benefits, hence of all wealth;
(2) that the ecosphere will only dispense these benefits if we religiously preserve its critical order; and
(3) that the overriding goal of an ecological society must be to preserve the critical order of the natural world or of the cosmos.(Goldsmith,p.6)

Goldsmith builds a case for re-instituting these traditional viewpoints into a new ecological worldview. He recognizes the connection between these traditional worldviews and new living systems theories like Lovelock's "Gaia hypothesis," in which the earth itself is viewed as one **homeostatic** living system, a self-regulating cybernetic system capable by "its" own efforts (or rather, the efforts of its living subsystems) to maintain its stability in the face of internal and external challenges. For example, just as the human body has organs and processes by which to maintain a temperature of 98.6 degrees Fahrenheit in the heat of summer

or the cold of winter, so the earth has living system processes that help preserve global balances, such as the countless micro-organisms in the sea which appropriately change color to either retain or reflect heat, depending upon the climatic conditions.

Goldsmith goes further to argue that life on earth has tendencies toward not only **"homeostasis"** (from the Greek *homeo* (same) and *stasis* (a standing still) but also **"homeorhesis"** (from the Greek *homeo* (same) and *rhesis* (flow) and **"homeotely"** (from the Greek *homeo* (same) and *télos* (goal). Beyond the fragmented and disjointed limits of modern industrial science, life has complex, multi-dimensional processes working in harmonious balances that modern industrial man ignores and threatens at his own peril. Goldsmith provides scientific examples of complex interaction between the biological, psychological, social and cultural levels of living systems throughout the world. He argues that the worldviews of many traditional indigenous societies are much more in tune with the ecological realities of the real world than is the fragmented, disjointed worldview of much of modern industrial society.

Much of Goldsmith's argument in support of the more holistic worldviews of traditional societies is right on target and provides dramatic new insights into a truer understanding of life. Where traditional worldviews fall short and what Goldsmith fails to acknowledge, is that through the predominant scientific system, modern industrial society has learned a lot of specific scientific details that are critical to better understanding how the world works. These scientific details, in and of themselves, may not help modern industrial society develop holistic strategies for avoiding societal and global self-destruction, but they provide important knowledge that, when placed within a proper conceptual context, can overcome arbitrary superstitions that may have hindered the development of the full potentials of traditional societies and that may actually be used to promote the health of living systems in general. When put into a proper **Living Systems Model of Community Development**, these scientific details provide the basis for greater human understanding and movement toward a new and more sustainable level of human existence and harmonious relationships with the rest of the living world.

Although Goldsmith provides some valuable insights into the wisdom of traditional cultures, he (mistakenly, I believe) would have us go back to a pre-historic culture in an attempt to erase the problems created by modern industrial society. He concludes that, "We must thereby set out to combat and systematically weaken the main institutions of the industrial system -- the state, the corporations -- and the science and technology which they use to transform society and the natural world."(Goldsmith,pp.37-38) In this despairing, cynical kind of "scorched earth first" argument, he denies the possibility that human society may be going through a painful process toward a new, higher level of living systems integration, a new context within which government, industry, science and technology are integrated into a living

systems context that brings life on earth to a new, higher level of existence. It is hoped the next and final section of this paper presents just such a case.

(5) Synthesizing a Living Systems Model of Community Development

If Aristotle, Socrates or Plato were to stand before you in Athens today to describe the nature of realities we face, how might they approach the problem of synthesizing a one-page **Living Systems Model of Community Development** that reflects the structure and workings of life? They would surely want to draw upon the storehouses of wisdom represented by the fundamental belief systems of traditional indigenous societies. But they would also want to draw upon the scientific discoveries of the last two millennium as they look toward the next millennium. They would want to read the sacred texts of many great cultures and they would want to look at the scientific evidence provided by telescopes and electron microscopes to better understand the basic structure of the universe.

An important step toward building such a model is to recognize a basic challenge to humanity that is presented by **sustainable development theory**. That challenge is to develop our human potentials without diminishing the natural resources upon which we, future generations and all of life depend on for survival and further flourishing. This relationship is illustrated in the following "Axis Line of Sustainability":

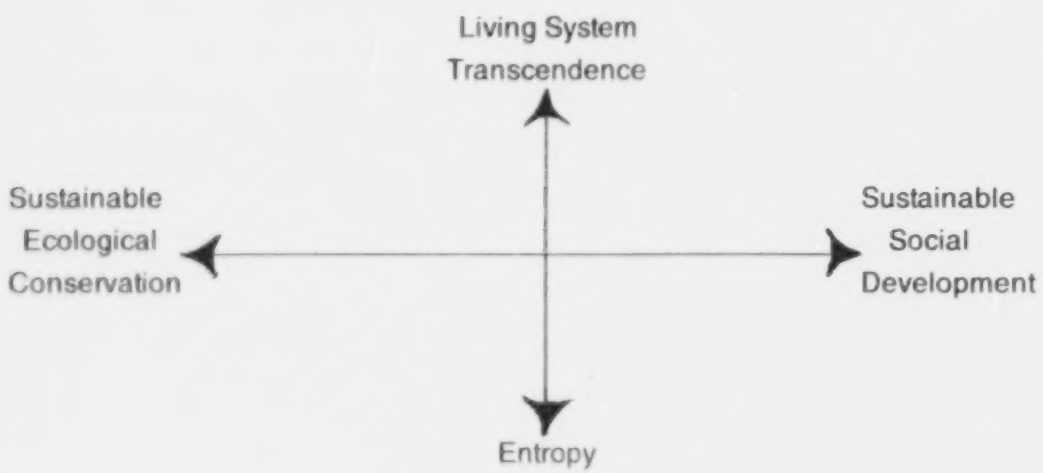
Figure 1. Axis Line of Sustainability

As illustrated in Figure 1, ecological conservation and social development are on opposite ends of a connected continuum where the two opposites are united in a dualistic Yin-yang relationship. It is a fundamental challenge of **sustainable development theory** to bring about a harmonious co-existence and even marriage between the two.

This dynamic relationship between environmental conservation and human development takes place within a larger context of **living systems theory**. A fundamental relationship inherent to all living systems is the challenge of resisting entropy within the physical world, as illustrated in Figure 2 (below). Figure 2 illustrates the cruel reality of life that over the long

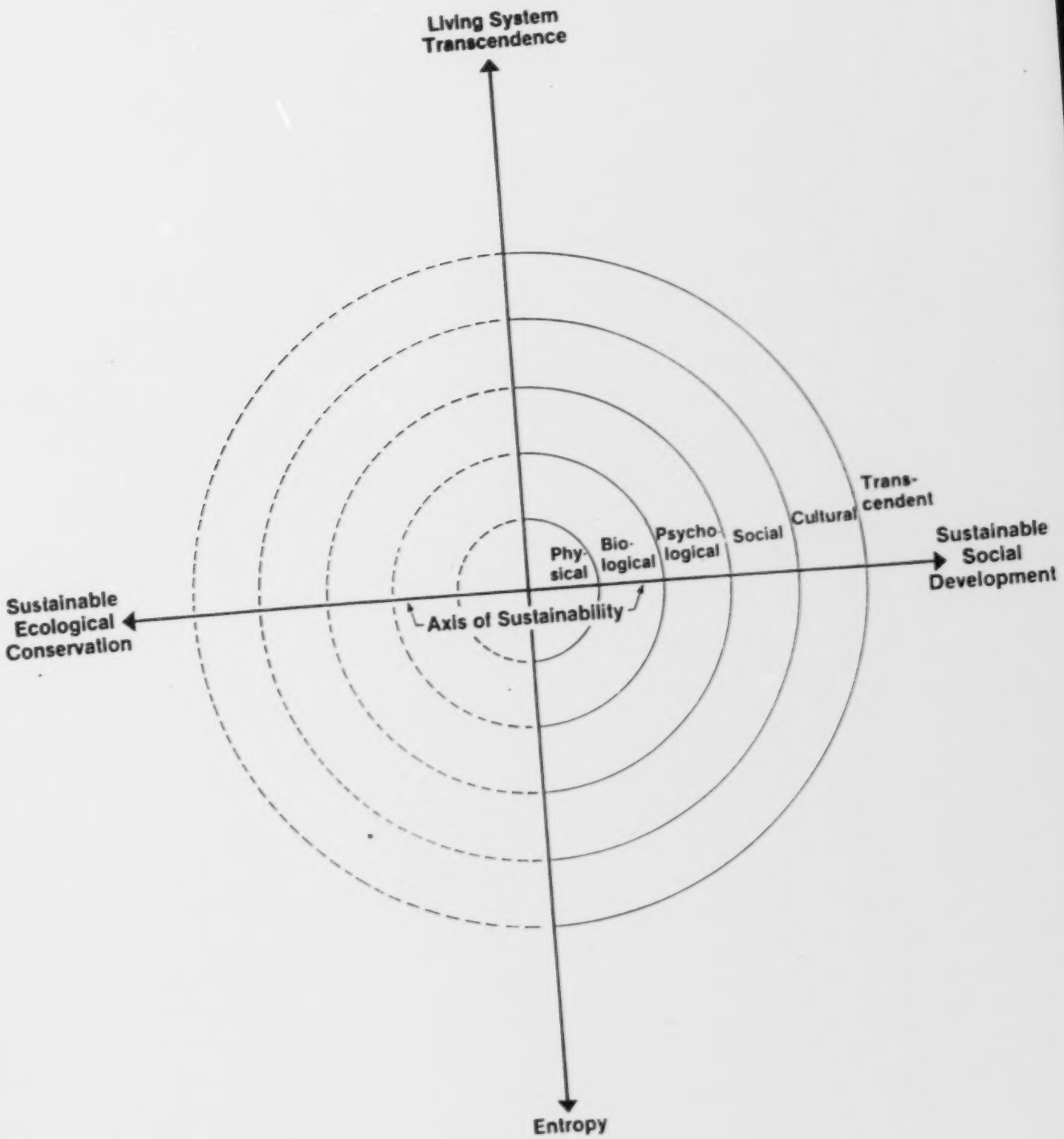
term, any living system which fails to resist entropy and instead consumes and breaks down the environment upon which its long-term survival depends is likely to face extinction, thus joining the crowded graveyard of living system experiments that have failed over the course of billions of years. When any living system consumes and/or pollutes at rates in excess of the capacity of its environment to be restored, it will actually be speeding up the entropy, or breakdown, of its environmental context of existence. In the long run, such living systems are likely to face extinction unless corrective actions are taken and new patterns of development adopted. Life has the unique capacity to regenerate and to correct earlier failure through an on-going interactive process of changing what didn't work in the past. Life at each higher level of complexity seems to have more options or choices for action and, at the same time, shoulders more responsibility for taking actions that help it survive and thrive.

Figure 2. Life's Relationship to the Physical World



Life's evolutionary course of development can now be illustrated in Figure 3 (below) by over-laying onto the emerging model's grid a series of five concentric circles. Each circle represents a fundamental shift that life has made toward more complex and integrated levels of existence ***by using its unique regenerative powers to resist entropy***. These five level of increasing complexity are reflective, as well, of five major levels of human scientific study: the physical, the biological, the psychological, the social, and the cultural. Figure 3 illustrates the process by which life has been able to transcend each level of existence to higher levels of integrated complexity: from the physical, to the biological, to the psychological, to the social, to the cultural. Moreover, it illustrates how life stands poised to transcend to even higher

Figure 3. Concentric Expansion of Life's Complexity By Resisting Entropy



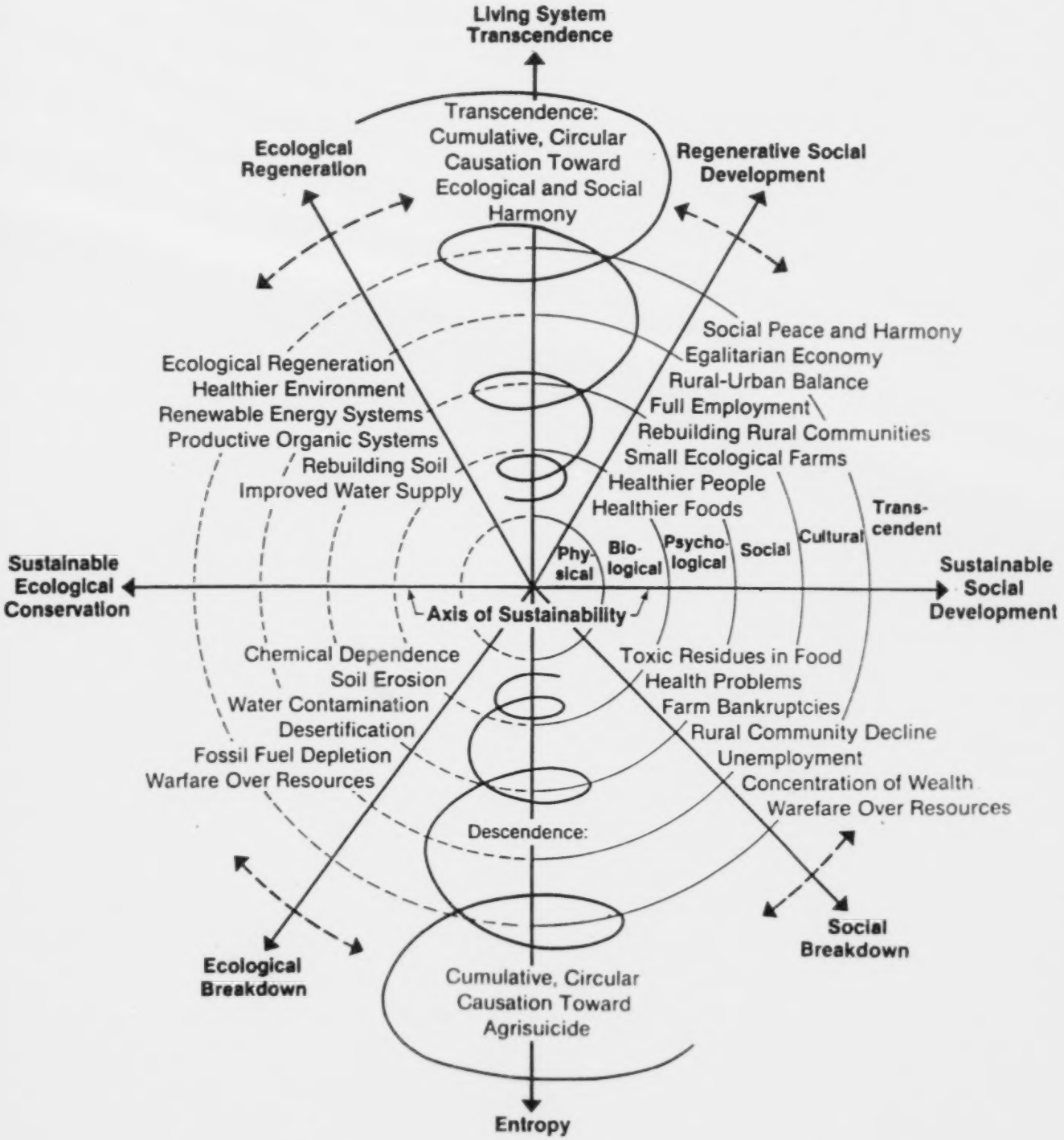
levels of existence as long as ways are found to resist entropy at each of the preceding levels of existence. The alternative choice humans have in modern industrial society is to continue speeding up entropy, thereby facilitating the declining potential of living systems on the planet and eventually fostering non-regeneration, death, or extinction and a return to lifeless entropy.

It is illustrated through this contextual model that life survives and thrives toward higher states of being by resisting entropy. The richness and diversity of life that we see on earth today is the result of countless regenerative life processes taking place over billions of years. These countless micro processes have been taking place within a regenerative living systems context toward higher and higher levels of integration and complexity. Life is an evolving process through which we move from the simple to more complex, more diverse and more integrated levels. This regenerative process has apparently enabled life to evolve from the purely physical, to living biological systems, to the psychological complexity of sentient beings reacting to their environments, to social interactions among individuals in groups, to even more complex cultural and transcendental relationships over long periods of time.

An important feature added to the model in Figure 4 (below) is the "**principle of circular cumulative causation,**" a concept pioneered by Gunnar Myrdal. This principle is based on the notion that when one part or level within a living system is allowed to decline, other parts of the system tend to be affected and decline as well, in a circular and cumulative fashion. Myrdal noticed this principle taking place among African Americans in the 1950s. He found in his study that one act of racism or another bad break for an individual or family on the brink of poverty would lead to a series of other connected problems on other levels that would, in turn, lead to further problems, in a circular and cumulative process. This is an important principle to remember in the context of complex and multi-dimensional living systems such as communities. In so many community contexts, we see that when problems that may be simple to deal with in the short term are ignored and left to fester, they often become major and intractable problems in the long term.

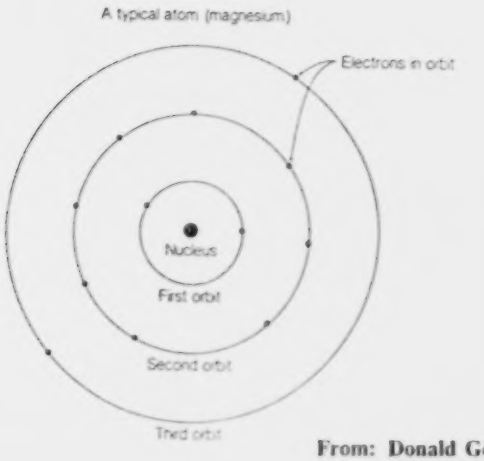
On the flip side of Myrdal's **"principle of cumulative causation,"** we can see that when positive things are encouraged to happen on a number of levels within a living system, there is likely to be a greater potential for circular cumulative causation toward a more healthy system on other levels of existence. When living systems are allowed to survive and thrive at the basic, fundamental levels, positive outcomes begin to take place that can far exceed initial expectations. Such is the regenerative capacity of the life of individuals as well as the life of communities.

Figure 4. A Living Systems Model of Community Development



A compelling feature of this concentric Living Systems Model of Community Development is that it reflects the concentric or circular pattern exhibited by many levels of the existing universe, from the atom through to the universe itself. Take, for example, the structure of the atoms that are the building blocks of all matter, as illustrated in Figure 5 (below).

Figure 5. The Concentric Structure of a Typical Atom

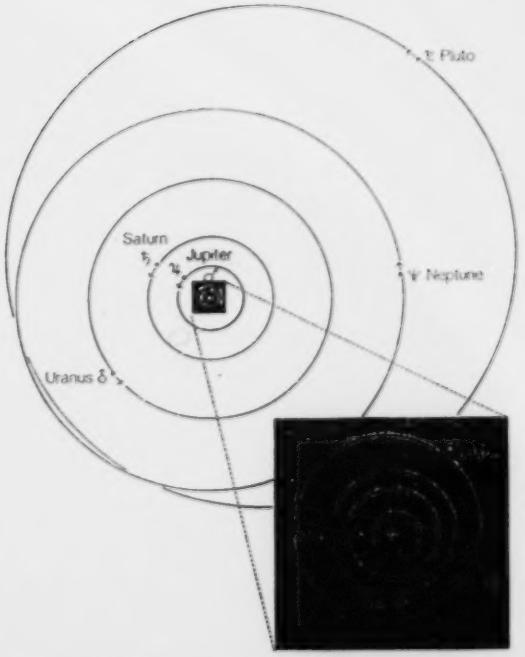


All atoms have a massive nucleus, made of protons and neutrons, surrounded by less massive electrons. The electrons can move only in certain orbits, with one particular orbit the smallest possible.

From: **Donald Goldsmith. *The Evolving Universe: An Introduction to Astronomy*. Menlo Park: The Benjamin/Cummings Publishing Company, 1981. p. 77.**

Similarly, note how the proposed model reflects the concentric or circular structure of the solar system (Figure 6), the Milky Way Galaxy (Figure 7) and the overall universe (Figure 8) from which life on earth is believed to have emerged.

Figure 6. Our Concentric Solar System



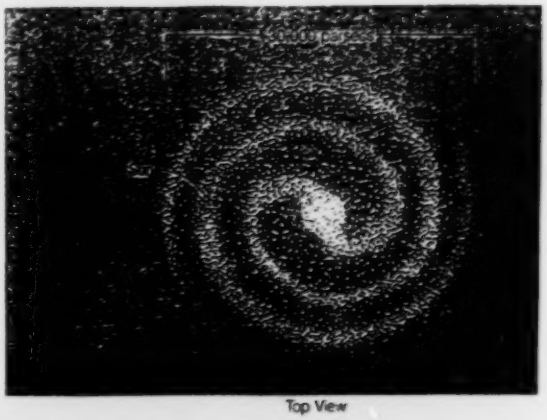
The orbits of Mercury, Mars, and Pluto deviate noticeably from circularity, while the other six planets have orbits that are almost, but not quite, perfect circles.

From: **Donald Goldsmith. *The Evolving Universe: An Introduction to Astronomy*. Menlo Park: The Benjamin/Cummings Publishing Company, 1981. p. 370.**

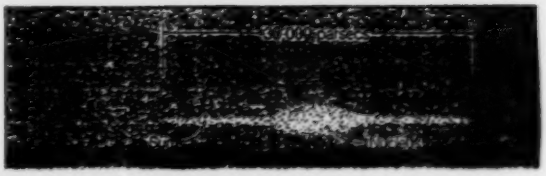
BEST COPY AVAILABLE

Figure 7. Our Understanding of the Circular Milky Way Galaxy

Modern observations have shown the Milky Way to be a giant spiral galaxy, basically a flattened disk with a central bulge or nucleus. Within the disk, bright young stars appear predominantly within the galaxy's "spiral arms," shown in the (imaginary) top view. The sun's distance from the galactic center is about 9000 parsecs. This complex spiral structure has been greatly simplified in this schematic diagram.



Top View



Donald Goldsmith. *The Evolving Universe: An Introduction to Astronomy.* Menlo Park: The Benjamin/Cummings Publishing Company, 1981. p. 101.

Figure 8. Our Understanding of the Expanding Universe

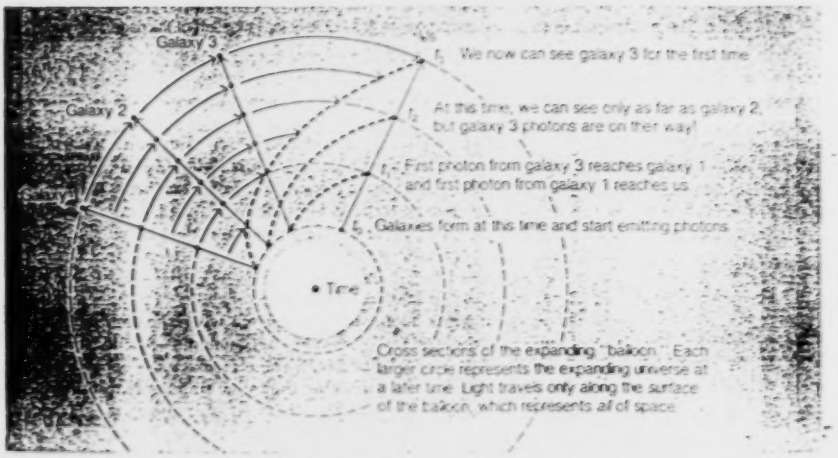

Galaxy 3
Galaxy 2
Galaxy 1
Time
We now can see galaxy 3 for the first time
At this time, we can see only as far as galaxy 2, but galaxy 3 photons are on their way!
First photon from galaxy 3 reaches galaxy 1 and first photon from galaxy 1 reaches us
Galaxies form at this time and start emitting photons
Cross sections of the expanding "balloon." Each larger circle represents the expanding universe at a later time. Light travels only along the surface of the balloon, which represents all of space

Figure 4-12 As the universe expands, we can see a progressively larger fraction of the universe is finite). This graph shows the increasing average separation between galaxies with increasing time. The dashed lines represent the tracks of light rays through space and time. Given enough time, we could see all the way "around" a finite universe.

From: Donald Goldsmith. *The Evolving Universe: An Introduction to Astronomy.* Menlo Park: The Benjamin/Cummings Publishing Company, 1981. p. 111.

BEST COPY AVAILABLE

While these scientific models from chemistry, astronomy and physics do not, in and of themselves, prove anything about the nature of life in communities or in life in the universe, it stands to reason that if each of these basic elements of our universe fit into similarly concentric or circular structures, then we might benefit from **"thinking like the universe"** and fitting our conceptual framework into a similar pattern. These models in Figures 6, 7, and 8 point to a common pattern, a common context that seems to be prevalent in the universe. Moreover, they contribute toward a better understanding of the context within which life is believed to have evolved and the context within which life continues to confront the daily struggle for survival. In combination with the concepts emerging from sustainable development theory, living systems theory, and emerging understandings of common characters of worldviews among many different traditional indigenous cultures, we begin to identify patterns and tools with which to better understand communities as complex and multi-dimensional living systems and we may further develop related tools with which to assess and promote the long-term sustainability of our communities -- from the local, to the national, to the global levels.

Like all conceptual frameworks, this **Living Systems Model of Community Development** needs to be tested and improved upon by gathering data from a wide range of sources and levels. The model is a tool for assessing and promoting the sustainability of complex systems such as communities where indicators of the physical, biological, psychological, social and cultural health of the system can be indexed at appropriate levels along the axis of sustainability within the model. Take topsoil, for example. Topsoil can be represented in the model on a concentric circle somewhere between the physical and the biological circular levels, because healthy soil is made up of both inert physical substances as well as many types of microbial biological life. Since the loss of topsoil at a rate of five tons per acre per year through erosion is generally considered a level at which most lands can maintain soil fertility indefinitely, that could be the index point for soil erosion on the horizontal **"axis of sustainability."** Any more soil erosion than five tons per acre per year would put the soil erosion index in the lower half of the model moving toward entropy. If less than five tons per acre per year of topsoil are being lost, soil erosion would then be indexed along a concentric circle in the upper half of the model moving towards higher levels of regenerative health and capacity. It would mean that more new topsoil is being formed than is being lost through erosion and that the land is tending to become more fertile over time, assuming that all other pertinent elements of the system remain constant.

Drawing upon the Phillips and LeGates' urban sociology text for psychological, social and cultural issues to index in the model, some key indicators of sustainability could include the degree of economic equity (p.426), the various indicators of social disorganization (crime, delinquency and family breakdown) identified by Robert Parks and other University of Chicago

sociologists (p.18,297) and general indicators of activities people can do to make cities more livable.(p4) Satin's idea of living in voluntary simplicity within smaller, self-sufficient communities is a social technology that would likely contribute to urban sustainability.(Phillips &LeGates,p.456) Community developers would surely want to index indicators of local democracy in action, as an example.

In effect, this model can serve as a **"living systems lens"** to provide a multi-dimensional snapshot of the relative sustainability of a particular living system or community at a particular point in time. The model is open-ended enough that it can be adapted to fit various living systems and communities, recognizing that all communities do not develop in the same way.(Phillips & LeGates, p.190) Although communities may not develop in the same way, it is hoped that all communities, when provided with a clearer picture of the likely consequences of unsustainable actions and activities, would seek to find ways to not only promote their own survival, but would also work toward environments more conducive to a higher quality of life for all in the long-term. In short, the model provides a context within which to better understand the foundations for building sustainable systems and communities.

Looking at higher level applications even further down the line, the model could be used to help chart growth toward higher states of being. That may mean greater global harmony through inter-cultural or trans-cultural understanding, or even improved understanding and connection with the source or sources of all life.

SUMMARY AND CONCLUSIONS

As we approach the 21st century, humanity stands at a crossroads. Continuing on the current unsustainable path of resource depletion and pollution, we are likely to destroy the basis upon which life has been able to evolve. If, on the other hand, we begin to see life from the perspective of a regenerative living systems framework and recognize our roles in working towards new and higher states of being by striving for true sustainability, we may begin to turn things around. This would likely represent a great achievement for humanity as it enters the new millennium.

This paper has been an attempt to synthesize a **Living Systems Model of Community Development** from key elements of sustainable development theory, living systems theory and common characteristic of traditional indigenous worldviews. By providing a framework within which knowledge from all the major disciplines in our fragmented academic world can be integrated, this "living systems" model helps synthesize a new, more holistic worldview with which to assess and promote the sustainability of communities. In effect, the

model can serve as a paradigm-level conceptual tool to promote a new way of viewing and interacting in communities at all levels -- from the local to the global.

The model is based on a scientific understanding of the basic structure of the key elements of the universe, from the smallest atoms to the largest astronomical systems, which are concentric and circular in pattern. The model represents an integration of the primary levels of science (the physical, biological, psychological, social and cultural) in the form of a series of expanding concentric circles that allows for additional transcendent levels to be developed as human understanding further expands.

This model can serve as a learning tool for people of all ages to better understand the meaning of sustainability in a living systems context. In combination with other modeling techniques, it can serve as a barometer for guiding community development toward more sustainable paths. In the end, it can function as the framework for a new paradigm of human understanding with regard community development.

This is an important time for community developers to step forward and be heard on the critical contemporary issue of community sustainability, an issue that concerns all our futures and the future of life on the planet. With the growing interest in community sustainability, we may be approaching a period when society is ready to commit the resources needed to build a common scientific vision for survival and truly sustainable development. Community developers are uniquely positioned and equipped to adopt the broad generalist perspectives that can help draw together diverse, multi-disciplinary perspectives to help build a new scientific paradigm that inherently works to promote sustainability and the potential for regeneration to higher states of existence in community.

By developing and implementing sustainability monitoring within the context of this living systems paradigm, we may begin to move toward the kind of communities in which we can all grow to our full potential without threatening the basis upon which all future life depends. It is a time for new ways of thinking and new ways of being. This simple vision of a **Living Systems Model of Community Development** could be one way to help guide our communities and humanity toward more sustainable courses in the future.

Bibliography

ALLEN, Peter M. "Towards a New Science of Complex Systems" in **Managing Global Systems**. (Helsinki: Club of Rome, 1984).

ANDERSON, Charles H. **The Sociology of Survival: Social Problems of Growth**. (Homewood: The Dorsey Press, 1976).

BOYDEN, Stephen. **An Integrative Ecological Approach to the Study of Human Settlements**. (Paris: United Nations Educational, Scientific and Cultural Organization, 1979).

BROWN, Lester. **Building a Sustainable Society**. (New York: W.W. Norton & Company, 1981).

BURCH, Lawrence & Jerry Wade. "Through the Glass Darkly: Twenty Years of Natural Resource Sociology" in **The Rural Sociologist**, 5:2, March 1985, pp. 90-94.

CAPRA, Fritjof. **The Web of Life: A New Scientific Understanding of Living Systems**. (New York: Doubleday/Anchor Books, 1996).

CARTER, Vernon Gill and Tom Dale. **Topsoil and Civilization**. (Norman: University of Oklahoma Press, 1974).

COATES, Gary J. **Resettling America: Energy, Ecology and Community**. (Andover: Brick House Publishing Company. 1981).

DALY, Herman E. **The Steady-State Economy**. (San Francisco: W.H. Freeman and Company, 1980).

DALY, Herman E. and John B. Cobb, Jr. **For the Common Good: Redirecting the Economy Toward Community, the Environment, and a Sustainable Future**. (Boston: Beacon Press, 1989).

DAHLBERG, Kenneth A. "Regenerative Food Systems: Broadening the Scope and Agenda of Sustainability" in **Food for the Future: Conditions and Contradictions of Sustainability**. Patricia Allen (ed.). John Wiley, 1993.

DASGUPTA, Sugata. **Toward a New Approach to Development**. (Calcutta: Institute of Social Change and Social Welfare, 1980).

DOXIADIS, C.A. **Ecology and Ekistics**. (London: Elek Books Ltd., 1977).

DRENGSON, Alan. "Nature, Community and Self" in **Communities: Journal of Cooperation**. No. 75. Summer 1988. pp.42-49).

DUMONT, Rene. **Utopia or Else**. (New York: University Books, 1975).

FERRE, Frederick. **Shaping the Future**. (New York: Harper & Row Publishers, 1976).

GOLDSMITH, Edward. "The Way: An Ecological World-View" in **Interculture**. Interculture Institute of Montreal. Volume 30, No. 1, Issue #132, Winter-Spring 1997.

HASKELL, Edward (ed.). Full Circle: **The Moral Force of Unified Science**. (New York: Gordon and Breach, 1972).

HEILBRONER, Robert. **An Inquiry Into the Human Prospect**. (New York: W.W. Norton Co., 1974).

HENDERSON, Hazel. **The Politics of the Solar Age: Alternatives to Economics**. (Garden City, NY: Anchor Press/Doubleday, 1981).

JOHNSON, Warren. **Muddling Toward Frugality**. (San Francisco: Sierra Club Books, 1978).

KUHN, Thomas S. **The Structure of Scientific Revolutions**. (Chicago: University of Chicago Press, 1970).

LOVELOCK, J.E. **Gaia: A New Look at Life on Earth**. (Oxford University Press, 1979).

LUTHER, Joseph and William Borner, **"Planning the Sustainable Community: Performance Indicators and Standards"**, a paper presented at the 1995 Annual Conference of the International Community Development Society.

MADDEN, J. Patrick. "Regenerative Agriculture: Beyond Organic and Sustainable Food Production" in **The Farm and Food System in Transition: Emerging Policy Issues**. (East Lansing: Michigan State University, 1984).

KRETZMAN, John P. and McKnight. **Building Communities from the Inside Out: A Path Toward Finding and Mobilizing A Community's Assets**. Chicago: ACTA Publications, 1993).

LARRICK, Steve. **Evaluating Industrial and Regenerative Paradigms for Agricultural Sustainability**. (Edmonton: University of Alberta, 1988).

MILLER, J.G. **Living Systems**. (New York: McGraw-Hill, 1978).

MYRDAL, Gunnar. "The Principle of Circular and Cumulative Causation" in **Economic Theory and Underdeveloped Regions**. (New York: Harper and Row, 1957).

NIEBUHR, Reinhold. **Moral Man and Immoral Society: A Study in Ethics and Politics**. (New York: Charles Scribner's Sons, 1932).

PHILLIPS, E. Barbara and Richard T. LeGates. **City Lights: An Introduction to Urban Studies**. (New York: Oxford University Press, 1981).

PIMENTEL, David and Marcia. **Food, Energy, and Society**. (New York: John Wiley & Sons, 1979).

PRESIDENT'S COUNCIL ON SUSTAINABLE DEVELOPMENT. **Sustainable America: A New Consensus**. (Washington D.C.: President's Council, 1996).

PRIGOGINE, Ilya and Isabell Stengers. **Order Out of Chaos: Man's New Dialogue with Nature**. (Toronto: Bantam Books, 1984).

RIFKIN, Jeremy. **Entropy**. (Toronto: Bantam Books, 1980).

RODALE, Robert. "Learning to Think Regeneratively" in **Regeneration**. Winter 1985-86, pp.32-34.

RODALE, Robert. "Regenerative Technology" in **Resurgence**, no.98, May/June 1983, pp. 52-57.

ROSZAK, Theodore. "Awakening the Ecological Unconscious" in **In Context**. 34:48-51. Winter 1993.

SCHUMACHER, E.F. **Small is Beautiful**. (New York: Harper Torchbooks, 1973).

SKOLIMOWSKI, Henryk. **Eco-Philosophy: Designing New Tactics for Living**. (Boston: Marion Boyars, 1981).

STAVRIANOS, L.S. **The Promise of the Coming Dark Age**. (San Francisco: W.H. Freeman and Company, 1976).

TODD, Nancy and John Todd. **Bioshelters, Ocean Arks, City Farming: Ecology as the Basis of Design**. (San Francisco: Sierra Club Books, 1984).

WISMER, Susan and David Pell. "Living the Good Life: Ecodevelopment" in **Alternatives**. 12:3/4. Spring/Summer 1985, pp.27-31.

WORSTER, Donald. **Nature's Economy: The Roots of Ecology**. (San Francisco: Sierra Club Books, 1977).

BEST COPY AVAILABLE